WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device, comprising:

sectioning semiconductor elements from a semiconductor wafer, which has an element region formed on its front surface, while keeping the sectioned semiconductor elements in a state held by a holding member;

picking up the sectioned semiconductor element from the holding member;

sticking an element adhesive film, which is sectioned according to the shape of the semiconductor element, to the back surface of the picked semiconductor element; and

adhering the semiconductor element to a semiconductor device forming base material by the element adhesive film.

2. The method of manufacturing a semiconductor device according to claim 1,

wherein the semiconductor element sectioning process has a process of sticking the holding member to the back surface of the semiconductor wafer and cutting the semiconductor wafer to form the sectioned semiconductor elements while keeping them in a state being held by the holding member.

3. The method of manufacturing a semiconductor device according to claim 1,

wherein the semiconductor element sectioning process has a process of forming modified layers or grooves, which are deeper than the thickness of the semiconductor element, from the front surface of the semiconductor wafer, a process of sticking a first

holding member to the front surface of the semiconductor wafer, grinding and polishing the back surface of the semiconductor wafer and sectioning the semiconductor elements while keeping them in a state being held by the first holding member, and a process of sticking a second holding member to the back surfaces of the semiconductor elements and separating the first holding member.

4. The method of manufacturing a semiconductor device according to claim 1, further comprising:

supplying a long element adhesive film from a supply roll and cutting the long element adhesive film according to the shape of the semiconductor element by mechanical cutting or laser cutting to form the sectioned element adhesive film.

5. The method of manufacturing a semiconductor device according to claim 1,

wherein the element adhesive film sticking process has a process of holding the sectioned element adhesive film by a porous adsorption member and sticking the element adhesive film being held by the porous adsorption member to the back surface of the semiconductor element.

6. A manufacturing apparatus of a semiconductor device, comprising:

a pickup section for picking up a sectioned semiconductor element from a semiconductor wafer which has sectioned semiconductor elements being held by a holding member;

a film sticking section for sticking an element adhesive film, which is sectioned according to the shape of the semiconductor element, to the back surface of the picked-up semiconductor element, and

an element adhesion section for adhering the semiconductor element, to which the element adhesive film is stack, to a semiconductor device forming base material.

7. The manufacturing apparatus of a semiconductor device according to claim 6,

wherein the film sticking section has a film supply section for supplying a long element adhesive film from a supply roll and a film cutting section for cutting the long element adhesive film supplied from the supply roll according to the shape of the semiconductor element by mechanical cutting or laser cutting.

8. The manufacturing apparatus of a semiconductor device according to claim 7,

wherein the film cutting section has an adsorption member for holding the element adhesive film and a cutting mechanism for cutting the element adhesive film being held by the adsorption member by stamping it.

9. The manufacturing apparatus of a semiconductor device according to claim 8,

wherein the adsorption member is made of a porous metal.

10. The manufacturing apparatus of a semiconductor device according to claim 7,

wherein the film cutting section has an adsorption member for holding the element adhesive film, a laser cutting mechanism for cutting the element adhesive film being held by the adsorption member, and a moving mechanism for moving the laser cutting mechanism or the adsorption member according to the shape of the semiconductor element.

11. The manufacturing apparatus of a semiconductor device

according to claim 10,

wherein the adsorption member is made of a porous metal.

12. The manufacturing apparatus of a semiconductor device according to claim 6,

wherein the pickup section has an adsorption collet for holding the semiconductor element and a push-up mechanism for separating the semiconductor element being held by the adsorption collet from the holding member by pushing up the back surface of the semiconductor element.

13. The manufacturing apparatus of a semiconductor device according to claim 12,

wherein the adsorption collet is made of a porous metal.

14. The manufacturing apparatus of a semiconductor device according to claim 6,

wherein the film sticking section has a film separation section for separating a protective film, which is disposed on the back surface of the element adhesive film stack to the semiconductor element.